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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,457	05/24/2000	Mark Vincent Pierson	EN9-99-102	5505

7590

06/17/2003

JOHN A. JORDAN
11 HYSPOD ROAD
GREENFIELD CENTER, NY 12833

EXAMINER

MITCHELL, JAMES M

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/577,457

Applicant(s)

PIERSON ET AL.

Examiner

James Mitchell

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-7 and 9-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There specification indicated that the sloped vias are provided additional freedom to flex both horizontally and vertically, but there is no support in the specification that the *interposer* be allowed to flex both vertically and horizontally.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 5, 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnio et al. (US 5,071,359) in combination with Stone (US5,770,476).

Arnio (Fig 2, 4f; Col.1, Lines 7-8) discloses an interposer for compliantly connecting a chip die (understood to be a chip; not labeled with an inherent pads) to a circuit board comprising a layer of elastic dielectric material (34) with an inherent elastic modulus having an array of copper, metal plated vias (Col. 3, Lin 35) extending from one surface of said dielectric to the other surface and with each of said metal vias similarly sloped with respect to said one and said other surface so as to allow said interposer to flex both vertically and horizontally; with each vias terminating in a metal pad (Fig 16) that inherently electrically connected to respective pads on said chip die and circuit board .

With respect to the claimed circuit card, Arnio discloses the same invention except that connection is made to a circuit board, Stone (Col. 1, Lines 24-25) shows that a circuit card is an equivalent structure known in the art known in the art. Therefore, because these two contact structures are art recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute a circuit card for a circuit board.

Furthermore the recitation in the claim, "so as to allow" is a sufficient to perform function, which is not a positive limitation but only requires the ability to do so.

Claims 4, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnio as applied to claim 3 or 5 and in further combination with Jimarez et al. (US 6,191,952).

Arnio further discloses the thickness of the dielectric to be 10 to 15 mils (Col. 4, Lines 23-24), but does not appear to explicitly disclose that the elastomer has a low modulus in the range of 50,000 to 4000,000 psi.

Jimarez utilizes silicone with a low modulus of 50,000.

It would have been obvious to one of ordinary skill in the art to incorporate a silicone, low modulus elastomer of 50,000 in order to provide a silicone elastomer as required by Arnio and to reduce stress as taught by Jimarez (Abstract).

Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Arnio and Stone as applied to claim 5, and further in combination with Sado (U.S 4,330,165).

Neither Arnio nor Stone appear to disclose that the through hole forms a V shaped metal plated via, however Sao utilizes a V shaped metal plated via.

It would have been obvious to one of ordinary skill in the art to form the interposer and through hole of Arnio V shaped in order to facilitate absorption of local stress as taught by Sao (Abstract).

Furthermore, absent evidence of criticality, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular dimensions of a sloped via or "V" shaped via because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose,

produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Arnio as applied to claim 6, and further in combination with Brodsky (U.S 5,984,691).

Arnio and Stone do not appear to explicitly disclose an array of holes therethrough positioned between an array of copper plated vias, however Brodsky (Fig. 1, 4) utilizes an array of holes (64) positioned between an array of vias.

It would have been obvious to one of ordinary skill in the art to incorporate an array of holes in the interposer of Arnio in order to reduce stress as taught by Brodsky (Column 7, Lines 8-9).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arnio and Stone as applied to claim 6, and further in combination with Isaacs et al. (U.S 5,275,330).

Neither Arnio nor Stone appear to explicitly disclose that plated through holes (PTH) or vias are filled with solder, however Isaacs (Fig 9) utilizes a PTH filled with solder.

It would have been obvious to one of ordinary skill in the art to fill the PTH or via of the prior art with solder in order to prevent unreliable electrical connections as taught by Isaacs (Abstract) and to provide a metal fill as required by Arnio (Col 7, Lines 20-21).

Response to Arguments


Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


jmm
June 14, 2003


Luon Thai